Beliefs in Learning and their Methodological issues

Keiko Sakui

The two disciplines, philosophy and psychology, have for some time pursued the construct of beliefs. Scholars have explored what beliefs exactly are, how they influence our world view, whether beliefs are changeable, and how they influence our behavior. These are abstract questions but at the same time very important and practical ones.

In this paper, I will mainly review social and educational psychology literature to examine the definition of beliefs and the difficulty in reaching a clear cut agreement of the concept at present. Regarding the nature of beliefs, I will specifically focus on belief change process. In the last section of the paper, I will discuss research methodologies used to investigate beliefs in language learning. Belief studies encompass a wide range of academic disciplines as stated above. Rather than addressing wide research areas and watering-down the discussion, I find it useful to narrow our focus to language learning and to examine research measures of domain specific beliefs.

What are beliefs?

Cognitive psychology had not dealt with affective factors such as

beliefs and attitudes, thus being criticized as "cold cognition", because these affective factors did not neatly fit with the computer-based processing cognitive science heavily relied on to explain learning (Zajonc, 1980).

Social psychology, however, has acknowledge the importance of the relationship between cognition and affect, "hot cognition", to understand learning from a broader perspectives (Dole & Sinatra, 1994). Eiser (1994) notes that we should not treat cognition and affect as mutually exclusive, but recognize that these two influence and interact each other. Further the influence, impact and effect of learners' beliefs on their learning is so profound that we should not ignore their implications in the classroom (William, 1994).

In this section I will explore the understanding and definition of beliefs in social and educational psychology. Beliefs are closely related to individual life history and educational experiences (Dole & Sinatra, 1994; Shommer, 1994). Dole & Sinatra (1994) provide the definition as follows:

> Social psychologists define beliefs as to be positive or negative evaluation people have about objects. And beliefs are building blocks of attitudes in that a set of beliefs makes up one's attitudes about an object. In this sense, an attitude is a related and interconnected network of beliefs (p.248).

This definition, which places beliefs under attitude, corresponds to the attitude theory (Crookes & Schmidt, 1991). That is, attitude consists of three components: affect, cognition and behavior. In this model, the beliefs belong to the category of cognition. Some recent

theories doubt the validity of these three components (Dole & Sinatra, 1994) and even the researchers who support this theory have not explained how the three components interact, yet it is important for us to note the attempt to explain the relationship between attitude and beliefs to understand beliefs themselves.

In discussing beliefs' evaluative characteristic, an experimental study sheds light on a philosophical yet important question. Alexander and Dochy (1994) has addressed the distinction between beliefs and knowledge. The researchers investigated the perception of three groups of adults, university students, faculties at university and educational researchers. Overall, these three groups agreed that knowledge and beliefs overlap, but at the same time they recognized the difference. They viewed knowledge as factual, unquestionable, and a stable concept, whereas beliefs are more personal and value-attached.

Similarly as another evidence to suggest the similarity and difference between beliefs and knowledge, terms such as prior-held knowledge and schema sometimes refer synonyms for beliefs (Dole & Sinatra, 1994). Again, as the word "knowledge" is a self explanatory evidence to link beliefs and knowledge, yet these synonyms show beliefs' individualistic character; each individual holds his/her own beliefs.

Studies in epistemological beliefs (Shommer, 1990; 1993; 1994) reveal an important aspect of beliefs: what beliefs consist of and whether beliefs are either uni-or multi-dimensional. One theory of beliefs proposed by Perry (1968) supposes that epistemological beliefs are uni-dimensional consisting of three progressive stages from unsophisticated to sophisticated: dualism (knowledge is dichotomous as right or wrong), multiplicity (recognizing conflicting opinions yet seeking the right answer) and relativism (knowledge varies depending

on context). However, Shommer (1990) claims that epistemological beliefs are not uni- but multi-dimensional. Even though she cautions that epistemological beliefs can cover a wider range of categories. But as a starting point, she proposes five categories for epistemological beliefs: fixed ability, simple knowledge, certain knowledge, and quick learning. A few replication studies have confirmed these categories (Shommer, Crouse & Rhodes, 1992; Dunkle, Schraw & Bendixen, 1993). She further claims that these categories are independent, meaning that a person who has sophisticated beliefs in one category does not necessarily have these beliefs in another category.

It is important for us to consider beliefs' uni- and multi-dimentionality. At present, researchers' position seems to vary from studies to studies (Horwitz, 1987; Luppescu & Day, 1992). Embracing both the uni- and multi-dimensionality of beliefs will enable researchers to more complex models of belief systems and in turn, hopefully, more accurate research methodologies.

From this review, it is extremely difficult to define beliefs in a clear concise way. However, what we can synthesize so far is that individuals construct and shape their beliefs based on their environmental stimulus and experiences about the specific contexts or objects. Beliefs are categorized under an umbrella term, affect, in the "cold" vs. "hot" cognition. From the perspective of attitude theory, beliefs are more cognitive oriented, compared to other constructs such as emotions. This orientation is also supported by the experimental study which suggests some overlap between knowledge and beliefs, and also that terms such as schema or prior-held knowledge are used for synonyms. Each individual's beliefs match, but not necessarily, the conventional knowledge which external societies or educational

context impose as fact or truth. Beliefs also significantly influence expectations and outcomes in educational settings.

Are beliefs changeable?

One of the purposes in education and instruction is to restructure and reconstruct students' knowledge and beliefs in specific knowledge domains to equate these intellectual properties with the "conventional" knowledge accepted by educational and social institutions. For example, can teachers change students' belief that heavier objects fall faster than lighter ones? In this section, I will focus whether beliefs can be modifiable or not.

A short answer to this question is probably yes (Alexander & Dochy, 1994; Dole & Sinatra, 1994; Eiser, 1994). However, the process of how these beliefs can be modified and changed remains unsolved and unexplained fully.

To help us understand persistence of beliefs, the description given by Abelson (1986) serves as a good start. He provides us with a very simple and intuitive explanation; beliefs are like our possessions. Once we acquire them, we tend to hold on to them and have difficulty in letting them go.

Dole & Sinatra (1994) emphasize that even young children come into the classroom with their own beliefs, not as blank boxes to be filled, but with their own knowledge or beliefs to make sense of the world. Extensive research suggest that students persist in their own beliefs when they receive contradictory information. Furthermore the gap between learners' and teachers' instructional beliefs can be significant and should be dealt with concern (McCormick, 1990).

In SLA, a study by Nunan (1988) suggests a clear contrast between the teacher's and students' ratings to the selected activities. While students rate correction very high and student self-discovery of errors low, teachers rate the former low and the latter very high. Nunan further argues that students expect to learn about a body of knowledge such as structural rules or vocabulary items. In contrast teachers think that learning consists of acquiring organizing principles through experience and they want to assist students so that they can become self-directed learners. It is plausible that the divergence in beliefs can indirectly influence students' motivation and commitment to classroom activities.

Extensive research in social psychology has investigated the process of belief change. There are two routes for beliefs to change: peripheral processing and central processing (For a review, see Dole & Sinatra, 1994). Peripheral processing, which involves external variables, such as likeliness of information sources, context and atmosphere of the learning and, comprehensibility and repetition of information has been extensively studied. Research demonstrates these peripheral processing variables can trigger belief change, yet at the same time they suggest these variables might have only a temporary effect.

Researchers argue that for major and long-term reconstruction of knowledge to occur, central processing is required. Central processing is internal processing, involving "deep thinking, critical reflection, and weighing of the issues" (Dole & Sinatra, 1994, p.257) in addition to the learners' motivation and effort to process the information. Although researchers mention the importance in central processing in abstract terms, and this matches our intuitive perception of learning, they have not shown specifically how instruction or the information

itself can cause "deep processing".

As reported in the previous section, beliefs are thought to be the building blocks of attitudes. It may be useful to review briefly attitude change theory here so that we can establish links between beliefs and attitude change. Eiser's (1994) historical view of attitude change shows that much research had focused on "peripheral processing" because of the influence of behaviorism in the fifties and sixties. In the seventies the focus changed with the influence of cognitive theory, which suggested that attitude change is due to cognitive dissonance which states that people are encouraged to reevaluate their attitudes to be consistent with their prior behavior. However Eiser claims that just because people are aware of the simple discrepancy between their attitude and past behavior, it does not necessarily lead to attitude change and we must account for more reflective and evaluative processes. Eiser's view sounds similar to "central processing" mentioned earlier. Based on this dissatisfaction, Eiser himself proposes that attitude change is not a linear process as in before and after a certain event, but a more complex and non-linear process. He utilizes connectionism and chaos theory to attempt to explain attitude change. Other studies have also utilized complexity and chaos theory to account for belief change (Goertzel, 1995).

As reviewed above, the issue of the belief change is still in a state of confusion. A common thread which emerges from the literature suggests that beliefs can be tenacious in nature, yet they are modifiable. And there are more than one route for beliefs to change. But if long-term beliefs do occur, learners themselves have to engage in reflective and evaluative process which requires students' motivation and deep thinking. How we can trigger this deep process in learners

needs to be investigated much further. Further development of belief change theory is needed to direct the future research.

Research Methodology

As the previous sections demonstrated, explaining beliefs and their change is yet a very messy and difficult task. In this section, I will address research methodology issues of beliefs in language acquisition since it will be beneficial to examine how domain specific beliefs have been investigated. Examining the contributions and shortcomings of this research will help us understand beliefs in general and beliefs particular in language acquisition.

In the field of language acquisition, a large number of studies have investigated affective factors, such as motivation and attitude. Beliefs often seem to be included in these constructs, for instance, Gardner's (1985) sociocultural model which proposes that learner's cultural beliefs influence their integrative motivation (Au, 1988).

However, fewer studies have dealt primarily or exclusively with beliefs. In this section, I will examine studies which treat beliefs as a central issue and address their research methodologies. Although research on beliefs have employed various research methodologies (Wenden, 1986: 1987), the most widely used tool is the likert scale questionnaire. Below I will review studies in which questionnaires were employed to quantitatively measure beliefs.

The questionnaire is a useful instrument to obtain data from a large number of participants in a relatively short time. The use of the questionnaire to measure beliefs originates with the study of attitude measurement. Thurstone (1928) explains why this type of instrument

is valid in measuring a complex variable such as attitude:

> It will be conceded at the outset that an attitude is a complex affair which cannot be wholly described by any single numerical index.... We say without hesitation that we measure a man when we take some authropometric measurements of him. The context may well imply without explicit declaration what aspect of the man we are measuring, his cephalic index, his height or weight or what not. Just in the same sense we shall say here that we are measuring attitudes. We shall state or imply by the context the aspect of people's attitudes that we are measuring. The point is that it is just as legitimate to say that we are measuring attitudes as it is to say that we are measuring tables or men (p. 530).

As Thurstone conveys, this type of measurement reveals attitudes related to specific context of researchers' interest; in other words, respondents express their opinions, either favorable (agree) or unfavorable (disagree), toward a given object in a given time. We should be aware that this measurement does not give us insights into the reasons why people hold such attitudes or on the process by which people acquire or change their attitudes (Eiser 1994).

One survey on learner beliefs in the area of SLA was developed by Horwitz's (1987): the Beliefs About Language Learning Inventory (BALLI). She identified the following five dimensions in language learning beliefs: 1) difficulty of language learning, 2) foreign language aptitude, 3) the nature of language learning, 4) learning and communication strategies and 5) motivations and expectations.

BALLI has been modified and tailored by different researchers to be specifically suitable to their target population. Adapted versions of BALLI have been given to diverse cultural and language background participants (Horwitz, 1988; Mantle-Bromley 1995; Keim, Furuya, Doye & Carlson, 1996). Other investigators (Mori, 1997; Luppescu & Day, 1990) have developed their own questionnaires to explore beliefs in language learning. They reported important findings in learner beliefs, however, many of them have yielded anomalous results.

Keim, Furuya, Doye & Carlson (1996) adapted BALLI questionnaire items so that the instrument would be context sensitive to Japanese university students of English. In this study three sets of variables were examined; the relationships between beliefs with 1) first year and second year students, that is, before and after the communicative instruction, 2) gender and 3) absences. The questionnaire responses did not support the hypotheses which were based on the communicative instruction students received and observed classroom interaction. For example, the only statistically different item was on the importance of the memorizing dialogs in learning speaking. The result was the opposite of what the researchers had predicted; the first year students who had little experience in communicative language teaching did not favor memorization of the dialogues, whereas the second year students with more experience in communicative language learning preferred dialogue memorization.

Mori (1997) administered a questionnaire to learners of Japanese to explore the correlational relationship between general epistemological beliefs (Shommer, 1990) and language learning beliefs. The correlation was significant for a few categories but not for the most items. She argues this is due to the complex and multiple independent dimen-

sions of the two sets of beliefs. Her interpretation is plausible but there might be other contributing factors to explain the low correlational relationship. One reason is that she administered the questionnaire only to ninety-seven students of Japanese. This is relatively a small number of participants for a survey study. Also her questionnaire has as many as 132 items. Even though she assigned it as take-home, the demand of completing the questionnaire is very significant. The length of the survey allows us to speculate on the reliability of the students' responses. Another reason is that she did not demonstrate construct validity for the language learning beliefs. Without knowing the questionnaire items' validity, it might be too ambitious and hasty to pursue its correlational relationship with another type of beliefs.

Similarly other researchers have attributed to their confusing results the lack of careful questionnaire development procedures. Even though Luppescu & Day (1990) executed quality control during the questionnaire development phase, their data failed to demonstrate the expected students' beliefs on classical and contemporary classroom teaching. They speculate that some of the questionnaire items might not clearly fit into either kind of these dichotomous categories. They further argue that students do not have any awareness of metaknowledge of language learning so their responses failed to fit in the researchers' presupposed categories. This raises an important issue of the validity of the questionnaire. What we should note in this study is that the investigators set the "categories" of beliefs a priori. We need to be aware that these categories may make sense to the researchers and teachers with certain knowledge of language learning. However, the categories might not make sense, or they might mean something different to students who do not possess this specific knowledge

(Luppescu & Day, 1990).

In this sense, BALLI test developers completed one crucial procedure to ensure a valid questionnaire. Horwitz (1988) reports that she gathered protocol data on beliefs of foreign language and ESL students, teachers and teacher educators. The data showed an overlap across these participants and Horwitz elicited the shared items among these participants. BALLI covers a wider range of beliefs held by different participants and this should enhance the credibility of the questionnaire.

Also this issue is related to the use of factor analysis in analyzing data. When researchers preset categories, they use factor analysis to confirm their hypothesis. On the other hand, when they administer a questionnaire in which items are not categorized as priori, factor analysis is run as an exploratory purpose to demonstrate which items cluster together and constitute categories. Each type of study is needed to fully treat the issue of dimensions in beliefs. Especially if beliefs are multi-dimentional, these two uses of factor analysis complement each other to reveal more about what the categories are and how these relate to each other.

In a study related to the statistical concerns of questionnaire development, Reid (1990) emphasizes the importance of statistical counseling in the process. Even though her questionnaire is on preferred learning styles, her detailed description sheds light on questionnaire development in general. The study which summarizes the complicated and time consuming process of establishing validity and reliability serves as a good educational reference to the investigators as well as the readers of survey research.

Furthermore Reid argues that the questionnaire should be normed

for the target population. Also she suggests that the items must be explicitly comprehensible and clear to the students, especially to ESL students with diverse cultural and language backgrounds. This can mean two things; one is that items should be written in simpler syntax and vocabulary. Another is that when students read the items they may interpret them within different contexts from which researchers anticipated. Lastly she claims that students from different cultural background respond differently to the items.

Reviewing this literature reveals that developing a good questionnaire is not an easy task. Many studies have failed to complete necessary procedures to secure questionnaires of good quality. Importantly, very few studies measuring beliefs have even attempted to establish the questionnaire's validity nor reliability. As long as we rely on questionnaire which lack validity, we can have little confidence in the replication of studies. Moreover, it will be extremely difficult to understand what we are exactly measuring, what kinds of beliefs people hold, and how we can best interpret the data so that it benefits language learning in classrooms. It is time for us to step back for a while to reexamine our work and perform the fundamental procedures necessary to develop a valid and reliable questionnaire.

As mentioned earlier, the contribution of the questionnaire can be significant. I would argue that questionnaires serves an initial exploratory stage to examine tendencies of learners' beliefs. If researchers have any specific belief categories to confirm, a questionnaire and factor analysis satisfies this purpose. But at the same time we should be aware of its limitations. As stated above, a questionnaires reveals only one aspect of beliefs: people's opinions in terms of agreement or disagreement with given statements in a given time.

We should expand our research questions and methodologies to be able to gain a deeper understanding in various aspects in beliefs in language learning. For example, interviews will let us obtain a wider range of students' beliefs. It will be useful to use interviews for exploratory stages to gather ideas for questionnaire items. Or interviews can be a complementing tool for a questionnaire to reveal the reasons why people hold such beliefs, or whether their beliefs have changed. Classroom observations can also contribute to questionnaire development. As reviewed in belief definitions, beliefs are tied closely to people's experiences. Understanding students' educational experiences will surely shed light on how and what beliefs can be shaped, how they are acquired and modified.

Conclusion

Investigating beliefs is an old and new endeavor. Alexander and Dorchy (1994) cite, for example, the great thinkers such as Plato and Aristotle have been struggling to understand the distinction between knowledge and beliefs. Today, as psychological theories and research methodologies advance, investigators still question how beliefs influence people's perception of the world.

Even though we recognize that beliefs play an important role in learning, beliefs' complex and messy nature is still hindering us to define and understand them clearly. In addition to the issue's complexity, the lack of careful procedures required in research methodologies leads in difficulty in theory development and understanding of beliefs. The methodology I examined, the questionnaire, should be developed with much greater care and precision, and also other types of

methodologies should be introduced to investigate beliefs further.

What we would need is more development of theory in the area and empirical studies with careful designs. As we all know theory and research interact each other and contribute to the further findings of beliefs and their roles in learning.

References

Abelson, R.P. (1986). Beliefs are like possessions. *Journal for the Theory of Social Behavior*, 16, 223-250.

Alexander, P.A. & Dochy, F.J.R.C. (1994). Adults' Views About Knowing and Believing. In R. Garner & P. A. Alexander (Eds.), *Beliefs About Text and Instruction with Text. Hillsdale, New Jersey.* Lawrence Erlbaum Associates.

Au, S.Y. (1988). A critical appraisal of Gardner's social-psychological theory of second language (L2) learning. *Language Learning*, 38, 75-100.

Crookes, G. & Schmidt, R.W. (1991). Motivation: Reopening the Research Agenda. *Language Learning*, 41: 4, 469-512.

Dole, J.A. & Sinatra, G.M. (1994). Social Psychology Research on Beliefs and Attitudes: Implications for Research on Learning From Text. In R.Garner & P.A.Alexander (Eds.), *Beliefs About Text and Instruction with Text.* Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Dunkle, M.F., Schraw, G.J., & Bendixen, L. (1993, April). *The relationship between epistemological beliefs, causal attributions and reflective judgment.* Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Eiser, J.R. (1994). *Attitudes, chaos and the connectionist mind.* Oxford: Blackwell.

Gardner, R.C. (1985). *Social psychology and language learning: The role of attitudes and motivation.* London: Edward Arnold.

Goertzel, B. (1995). Belief Systems as Attractors. In R. Robertson & A.

Combs (Eds.), *Chaos Theory in Psychology and the Life Sciences*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Horwitz, E.K.(1987). Surveying student beliefs about language learning. In A.Wenden & J.Rubin (Eds.) *Learner Strategies in Language Learning*. Englewood Cliffs, New Jersey: Prentice Hall.

Horwitz, E.K.(1988). The Beliefs about Language Learning of Beginning University Foreign Language Students. *The Modern Language Journal*, 72, 283-293.

Keim, B., Furuya, R., Doye, C., & Carlson, A.(1996). A Survey of the Attitudes and Beliefs About Foreign Language Learning of Japanese University Students Taking Communicative English Courses. *Jacet Bulletin*, 27, 87-106.

Luppescu, S. & Day, R.R.(1990). Examining attitude in teachers and students: the need to validate questionnaire data. *Second Language Research* 6, 125-134.

Mantle-Bromley, C.(1995). Positive Attitudes and Realistic Beliefs: Links to Proficiency. *The Modern Language Journal*, 79, 372-386.

McCormick, K.(1990). The cultural Imperatives Underlying Cognitive Acts. *Reading to Write: Exploring a Cognitive & Social Process*. New York: Oxford university Press.

Mori, Y.(1997, April). *Epistemological Beliefs and Language Learning Beliefs: What Do Language Learners Believe About Their Learning*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Nunan, D. 1988. *The learner-centered curriculum*. Cambridge: Cambridge University Press.

Perry, W.G., Jr.(1968). *Patterns of development in thought and values of students in a liberal arts college: A validation of a scheme*. Cambridge, MA: Bureau of Study Counsel, Harvard University. (ERIC Document Reproduction Service No. ED 024315)

Reid, J.(1990). The Dirty Laundry of ESL Survey Research. *Tesol Quarterly*, 24, 323-338.

Shommer, M.(1990). Effects of beliefs about the nature of knowledge on

comprehension. *Journal of Educational Psychology*, 82, 498-504.

Shommer, M., Crouse, A., & Rhodes, N.(1992). Epistemological beliefs and mathematical text comprehension: Believing it's simple doesn't make it so. *Journal of Educational Psychology*, 84, 435-443.

Shommer, M.(1993). Epistemological development and academic performance among secondary students. *Journal of Educational Psychology*, 85, 1-6.

Shommer, M.(1994). An Emerging Conceptualization of Epistemological Beliefs and Their Role in Learning. In R. Garner & P.A. Alexander (Eds.), *Beliefs About Text and Instruction with Text*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Thurston, L.L.(1928) Attitudes can be measured. *American Journal of Sociology*, 33, 529-554.

Wenden, A.(1986). What do second language learners know about their language learning? A second look at retrospective accounts. *Applied Linguistics*, 7, 186-201.

Wenden, A.(1987). How to be a successful learner: insights and prescriptions from L2 learner's. In A. Wenden & J. Rubin (Eds.) *Learner* Strategies in Language Learning. Englewood Cliffs, New Jersey: Prentice Hall.

William, J.P.(1994). The Importance of Examining Belief about Text. In R.Garner & P.A.Alexander (Eds.), *Beliefs About Text and Instruction with Text*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Zajonc, R.B.(1980). Feeling and thinking: preferences need no inferences. *American Psychologist*, 25, 151-175.

Beliefs in Learning and their Methodological issues

Keiko Sakui

Although many researchers and teachers acknowledge epistemological beliefs are an important factor in successful learning outcome, considerable controversy still exists in defining beliefs and explaning their nature and exact role in learning. In this paper I will review current developments in understanding beliefs mainly in the fields of psychology and education. Then I will shift my focus to the measuremnent of beliefs in language learning, specifically the use of questionnaires. The investigation reveals that in addition to the complex nature of beliefs, the lack of validation of research instruments are hindering the field to come to a better understanding of the beliefs and their role in language learning.